

**The Electronic Documentation Project
In The NASA Mission Control Center Environment**

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**Lui Wang
Albert Leigh¹
Software Technology Branch (PT4)**

**Information Systems Directorate
National Aeronautics And Space Administration Agency
Lyndon B. Johnson Space Center
NASA Road 1
Houston, TX 77058**

NASA's space programs like many other technical programs of its magnitude is supported by a large volume of technical documents. These documents are not only diverse but also abundant. Management, maintenance, and retrieval of these documents is a challenging problem by itself; but, relating and cross-referencing this wealth of information when it is all on a medium of paper is an even greater challenge. The Electronic Documentation Project (EDP) is to provide an electronic system capable of developing, distributing and controlling changes for crew/ground controller procedures and related documents. There are two primary motives for the solution. The first motive is to reduce the cost of maintaining the current paper based method of operations by replacing paper documents with electronic information storage and retrieval. And, the other is to improve the efficiency and provide enhanced flexibility in document usage.

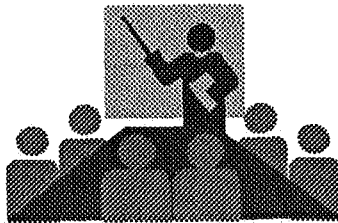
Initially, the current paper based system will be faithfully reproduced in an electronic format to be used in the document viewing system. In addition, this metaphor will have hypertext extensions. Hypertext features support basic functions such as full text searches, key word searches, data retrieval, and traversal between nodes of information as well as speeding up the data access rate. They enable related but separate documents to have relationships, and allow the user to explore information naturally through non-linear link traversals. The basic operational requirements of the document viewing system are to: provide an electronic corollary to the current method of paper based document usage; supplement and ultimately replace paper-based documents; maintain focused toward control center operations such as Flight Data File, Flight Rules and Console Handbook viewing; and be available NASA wide.

¹ Albert Leigh is currently with LinCom Corporation on the Technology Development Contract to support the Software Technology Branch, NASA Johnson Space Center, Houston, TX.

EDP

The Electronic Documentation Project In the NASA Mission Control Environment

Dual-Use Space Technology Transfer Conference and Exhibition



Presented by
Lui Wang/PT4
Albert Leigh/LinCom

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Overview

- The EDP Team
- Background
- Documents
- Objectives
- Viewer System
- Workflow System
- System Infrastructure
- Conclusion

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NASA Johnson Space Center

- Mission Operation Directorate (EDP project management, hardware/software evaluation and selection)
- Information Systems Directorate (software development, hardware/software consultation)

Other NASA Centers

- Ames Research Center (Flight Planning System to be compatible with EDP viewer)
- Jet Propulsion Lab (hardware consulting for storage, software consulting for library management)

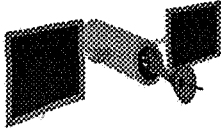
Space Program Support

- Large volume of technical documents
- Challenging problem associated with paper-based system:
 - management and maintenance
 - storage and retrieval
 - cross-reference information
 - distribution and exchange

New Direction

- Emergence of new industrial/international standards and hardware/software systems

Documents

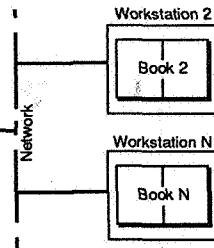
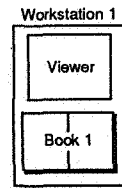
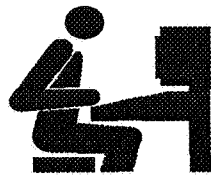


- **Flight Data File (FDF)**
 - procedural checklists, timelines, schematics, charts, cue cards, photos, uplinked text messages, etc
- **Flight Rules**
- **Operator Console Handbook**
- **Space Shuttle System Handbook Drawings**

Objectives

- **Develop an electronic documentation system for flight controllers**
- **Two major goals to provide:**
 1. An electronic document viewing system in the office environment and in the Mission Control Center (MCC)/Control Center Complex (CCC)
 2. An integrated electronic work flow system which includes FDF distribution, 482 tracking, e-mail, and electronic signature, etc.
- **Expand EDP from MOD to JSC, NASA centers, commercial/educational sectors**

Viewer



Network

EDP

- Developed Level-A Requirements
- Evaluated NASA, COTS and Internet products
- Selected NASA/JSC (PT4)'s HyperMan 2.0 viewing software that provides full-range of hypertext capabilities

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Viewer

Requirements

- Page-based presentation
- Topic-based browsing
- Multiple user access to a document
- Multiple document access by a user
- Configuration controlled document viewing
- Hypertext features

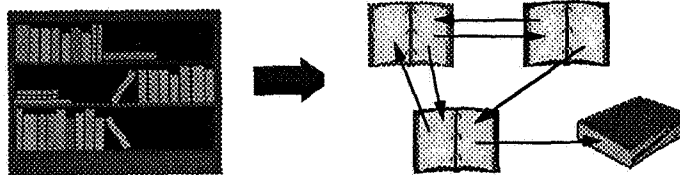
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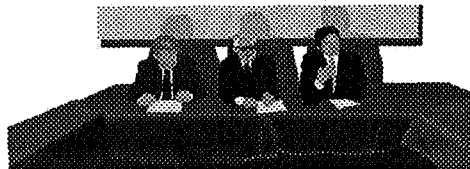
Hypertext

- On-line presentation of large amounts of loosely structured information
- Non-linear traversal
- Electronic cross-referenced information
- Search capability
- Annotations



Evaluation

- NASA Products: HyperMan, CID, HyLite
- Internet Products: Mosaic, etc.
- COTS: Interleaf, Frame, DynaText, etc.



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Conclusion

- **Reduce costs (printing, distribution, etc.)**
- **Reduce storage requirements**
- **Increase efficiency in information access, retrieval and exchange**
- **Improve reliability**
- **Spinoffs to external organizations**